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(54) Method of producing a spring insert.

(57) The production of spring inserts (9) can be considerably improved by means of the method according to the invention, whereby use is made according to requirements of strings (15) with different resiliency and/or damping characteristics.

This makes it possible, in one and the same plant, to produce spring inserts (9) which are built up of strings with different characteristics, whereby spring inserts (9) with improved characteristics can be produced.

The joining of the strings (15) in the formation of the spring insert (9) is carried out using an adhesive (26) which is applied to one side of the string as this passes a nozzle (24). The rate of production can hereby be increased in relation to the known methods of adhesive application.

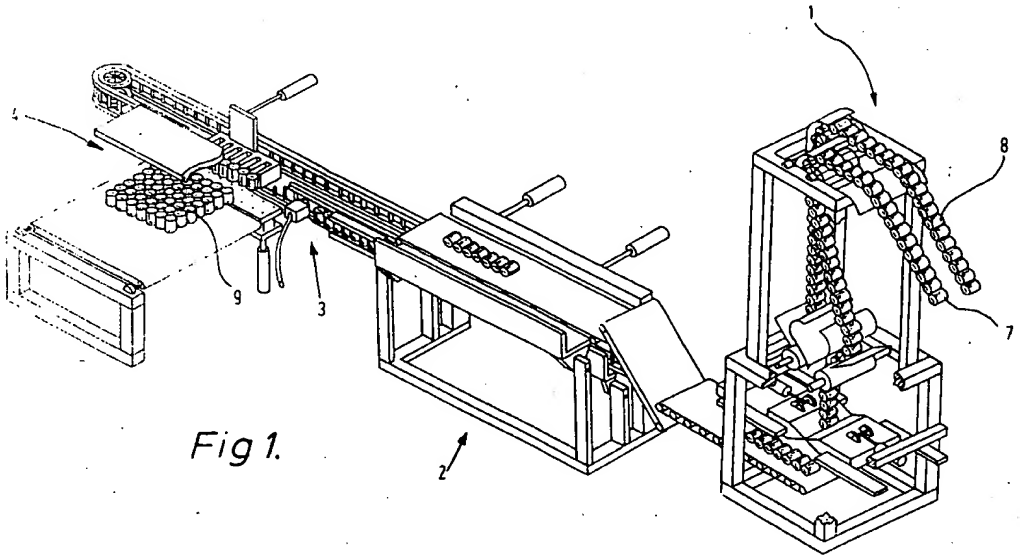

Fig 1.

EP 0 624 545 A1

Background of the invention

The invention relates to a method of producing a spring insert from strings of springs which are individually encased in a pocket of material, so-called pocketed springs, said strings having an adhesive applied and being compressed to form the spring insert.

The production of spring inserts from strings of pocket springs is normally effected by cutting from a length of a given number of pocket springs in a string, after which the strings are glued together to form the spring insert.

A method is known from the description provided in EP, B1, 0154076 and EP, A2, 0155158, whereby heat-fusible adhesive is applied to the outer string in the spring insert, after which an additional string is pressed into place and glued together with the first string.

The spring insert is finished after a suitable number of strings have been glued together. Hereafter, it can be incorporated into a mattress, a cushion or the like in a commonly-known manner.

This known method is limited to the production of spring inserts with the same resiliency characteristics in the insert for the whole extent of the insert. The spring insert comprises only one type of pocketed spring, in that all of the strings are cut from the same length.

Moreover, the adhesive is applied by means of movable nozzles which, during the emission of the adhesive, are led along the outer layer of the spring insert. This means that the pressing-together of the subsequent string must await the application of adhesive before the string can be glued to the preceding string. This gives rise to the risk of the glue running or flowing out, so that the gluing-together either becomes too weak or too extensive, depending on the state of the adhesive at the moment that the compression is effected.

The use of the method is therefore limited to the production only of homogeneous spring inserts with uniform pocket-springs, and is limited by a troublesome and protracted application of adhesive which is difficult to control.

Advantages of the invention

With the method according to the invention, whereby the strings used have different resiliency and/or damping characteristics, it is possible in a surprisingly simple manner to produce a spring insert with ideal characteristics, in that there can be built up a spring insert which is in accord with the load on the individual parts of the spring insert. This permits production of spring inserts, and herewith mattresses, cushions etc., which are in complete accordance with the degree of support they are desired to provide.

Since this can be effected in a simple manner, the cost of production will not be substantially greater, while the finished product has far superior characteristics with regard to both comfort and health.

There can thus be used strings with different characteristics with regard to both dimension and form of the spring elements for the changing of the resiliency characteristic, and pockets can be made of material which can be more or less flexible for changing of the damping characteristic.

With the method according to the invention, it will also be possible to produce spring inserts of different shapes and extent, the reason being that lengths with different heights can be incorporated, and that the strings can be of different lengths.

With the method according to the invention, it herewith becomes possible to produce spring inserts which can fulfil any requirement with regard to their qualities of resilience and support, and without this being encumbered by a considerably higher cost of production.

As disclosed in claim 2, by using a cutting mechanism which is fed with two or more lengths, there is freedom to choose to feed a given string having qualities which are precisely in accordance with its positioning in the finished spring insert, and in the desired length, i.e. number of pocket-springs in the string.

As disclosed in claim 3, the application of the adhesive to the string while this is in movement provides the advantage that the production process is not delayed, but is limited only by the speed with which the string is fed past, and also that the construction is simple and without moving parts.

As disclosed in claim 4, by applying adhesive only to the surfaces which touch each other, the consumption is limited as much as possible, and the resiliency characteristics remain unaffected.

As disclosed in claim 5, by applying the adhesive in shots, these can be synchronized with the feeding of the string so that a perfect positioning of the adhesive is quickly ensured, and completely without any risk of undesired application of adhesive on the insert's surrounding parts.

Finally, as disclosed in claim 6, it is expedient to arrange the lengths so that they are fed with the longitudinal axes of the pocket-springs being horizontal, and thereafter tip the string 90° before applying the adhesive, whereby the length and the string are conveyed without risk of displacement in relation to their support or one another.

The drawing

In the following section, an example of a plant for the execution of the method will be described in

more detail with reference to the drawing, where

fig. 1 shows a perspective drawing of a plant according to the invention,

fig. 2 shows the actual cutting-off device with the one length in use,

fig. 3 shows the cutting-off device with a second length in use,

fig. 4 shows the turntable before the turning of the string,

fig. 5 shows the turntable during the turning of the string,

fig. 6 shows the actual compression device before the compression of a string with adhesive applied, and

fig. 7 shows the compression of the string against the remaining strings during the production of a spring insert.

Description of the example embodiment

A plant for the execution of the method is illustrated in fig. 1.

The plant comprises a feeding section 1, which will be described in more detail with reference to figs. 2 and 3, a turning section 2, which will be described in more detail with reference to figs. 4 and 5, and an adhesive application section 3 and a compression section 4 which will be described in more detail with reference to figs. 6 and 7.

As shown in figs. 2 and 3, the feeding section 1 consists of a frame 5, on the top of which are supported a number of wheels 6 corresponding to the number of pocket-spring lengths 7, 8.

These lengths 7 and 8 can have different resiliency and/or damping characteristics, so that in the example embodiment shown there can be produced a finished spring insert 9 consisting of two different types of pocket-springs.

The wheels 6 are preferably sprocket-formed so that the lengths 7 and 8 can be fed by rotation of the wheels. In order to prevent the lengths 7 and 8 from jumping out of the wheel 6, a shield 10 can be mounted over a part of the wheels' circumference.

Under each set of wheels 6 there is mounted a further set of drive rollers 11 for each length 7, 8, so that each individual length can be fed in a precise manner. In practice, the wheel sets 6, 11 will be synchronized by means of a chain drive or the like.

Under the drive roller 11 there is mounted a cutting mechanism 12 comprising two jaws 13 which can be moved in a reciprocating manner by means of an actuator 14, so that the lengths 7 and 8 can be fed between the jaws 13 when these are separated.

In this position, the drive roller 11 can feed a certain number of pockets in the length 7 and 8 so that a given number of pockets, corresponding to the length of the string 15, will form one element in the finished spring insert 9.

When the string 15 has been formed, the jaws 13 are closed and the length is cut over either mechanically or thermally.

Below the cutting mechanism 12 there is mounted a conveyor belt 16. This conveyor carries the string 15 further to an angularly-extending belt 17 which leads the string 15 forward to the turning section 2.

As shown in figs. 4 and 6, this section is configured with a conveyor belt 18 on which the string 15 is fed forward in the section.

When the belt 18 is stopped, a boom 19 operated by actuators 20 pushes the string over the side where it falls down on a side-stop 21. As shown in fig. 5, the side-stop is thereafter tipped so that the string falls down into a gutter 22.

In the gutter 22, the string 15 is fed into a chain conveyor 23 which is moved from the turning section 2 and further through the compression section 4.

Hereafter, the conveyor 23 feeds the string 15 past an adhesive application device 24 which can be of any suitable type.

A fluid adhesive is advantageous, the reason being that this can be pumped out through nozzles via a pipe 25. This makes it possible for the adhesive to be pumped out in shots, and the adhesive 26 can hereby be applied to the outer side of each pocket-spring in the string as this passes the nozzle(s).

The chain conveyor 23 stops when the string 15 is standing opposite a pusher arm 27, this being provided with an end profile which enables it to lie up against the string 15.

Hereafter, an actuator 28 can feed the string 15 with adhesive 26 on to an underlayer 29 where it can be pushed up against preceding strings for gluing together with the outermost string.

The spring insert 9 is hereby built up of strings 15 which one after another are glued together to form the finished insert 9.

When the last string 15 has been glued on, the belt 29 is started and the spring insert is led away.

The following is a description of the method.

The lengths 7 and 8 with the desired resiliency and damping characteristics and dimensions are fed to the plant in the form of endless lengths of pocket-springs 7 and 8.

In the example shown there are two lengths with the same outer dimension, but there will be nothing to prevent the use of several lengths and lengths with other dimensions.

There can hereby be produced spring inserts of any desired kind and character, also including spring inserts comprising pocket-springs of differ-

ent heights.

The plant is controlled in a commonly-known manner by microprocessors so that it is possible to select to feed strings of any desired length, said strings then being tipped upright and receiving an application of adhesive before the final compression.

The whole method is controlled so that all movements are synchronized, whereby strings can be produced at a very high rate of production, the reason being that the whole of the flow can be effected at the same tempo.

The choice of pocket-spring strings is determined by the activation of the sets of feeding wheels, whereby strings can be produced at normal rates of production, even when there are frequent changes between the strings.

Claims

1. Method of producing a spring insert from strings of springs which are individually encased in a pocket of material, so-called pocketed springs, said strings having an adhesive applied and being compressed to form the spring insert, **characterized** in that strings (15) with different resiliency and/or damping characteristics are used.

2. Method according to claim 1, **characterized** in that the string (15) is cut from a length (7, 8) in a cutting device (1) to which several lengths (7, 8) are supplied, and where each length is fed to a cutting mechanism (12, 13) by means of an adjustable feeding arrangement (6, 11) in such a manner that the selection of the length (7, 8) and the length of the string (15) can be adjusted.

3. Method according to claim 1, **characterized** in that the adhesive (26) is applied to the string (15) during its movement past one or more nozzles (24) before the compression.

4. Method according to claim 3, **characterized** in that the adhesive (26) is applied only to the outer side of the pockets where pockets of abutting strings (15) lie up against each other after the compression.

5. Method according to claims 3 and 4, **characterized** in that the adhesive (26) is pumped out through the nozzle(s) in a jet on the outer side of the pocket when the pocket is opposite the nozzle(s).

6. Method according to claims 1-5, **characterized** in that the length(s) (7, 8) are fed over wheels/sprockets (6, 11) with horizontally-extending axes to the cutting mechanism (12, 13), after which the string (15) is fed in a commonly-known manner on to a turning table (2) where the string (15) is tipped upright, whereafter the string (15), by means of a chain conveyor (23) in the form of an endless chain over carrier wheels with vertical axes, is fed past the adhesive application nozzle(s) (24) before being positioned on a horizontally-displaceable arm (27) which thereafter presses the string (15) up against the preceding string in the spring insert (9).

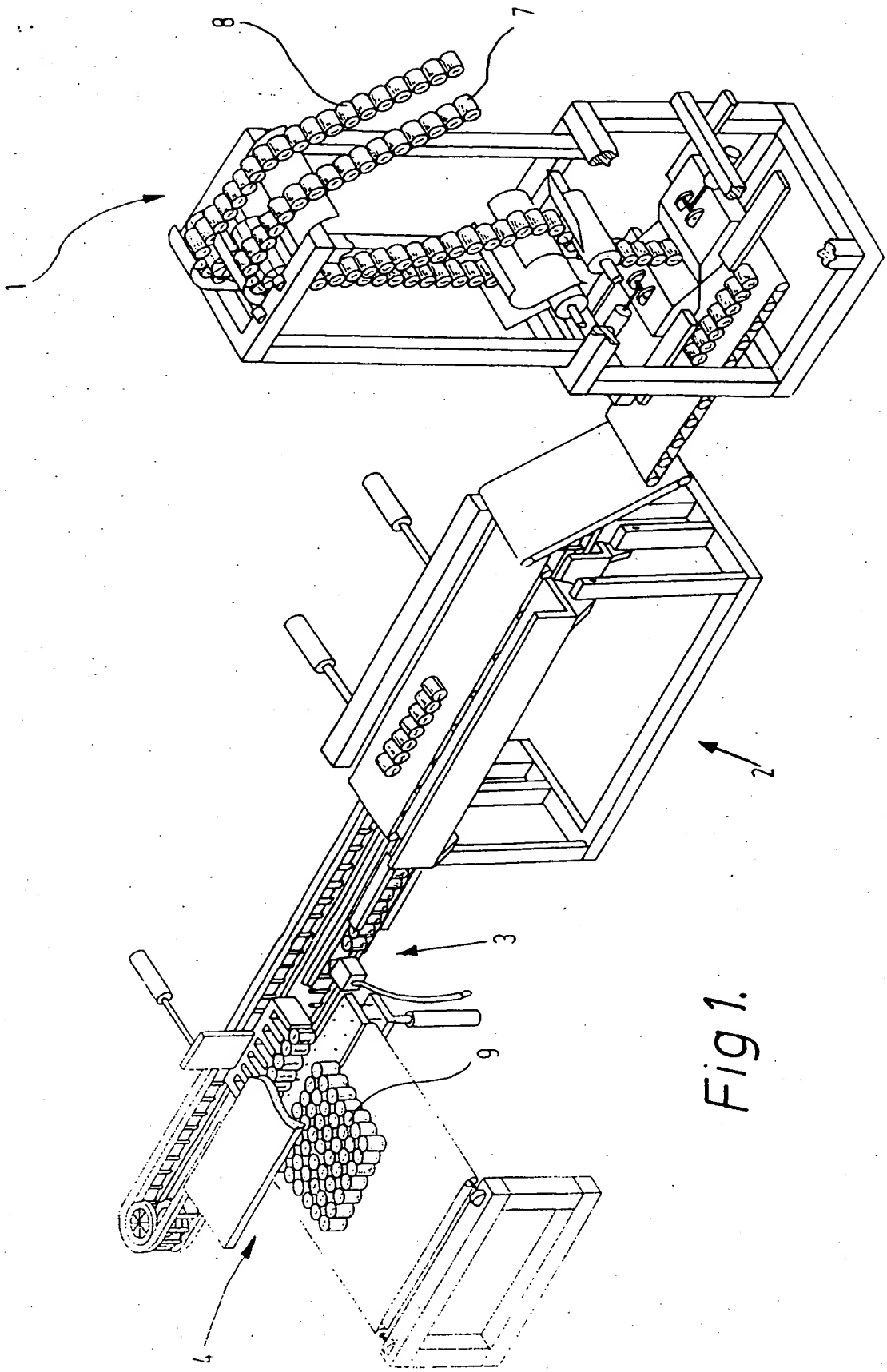

Fig 1.

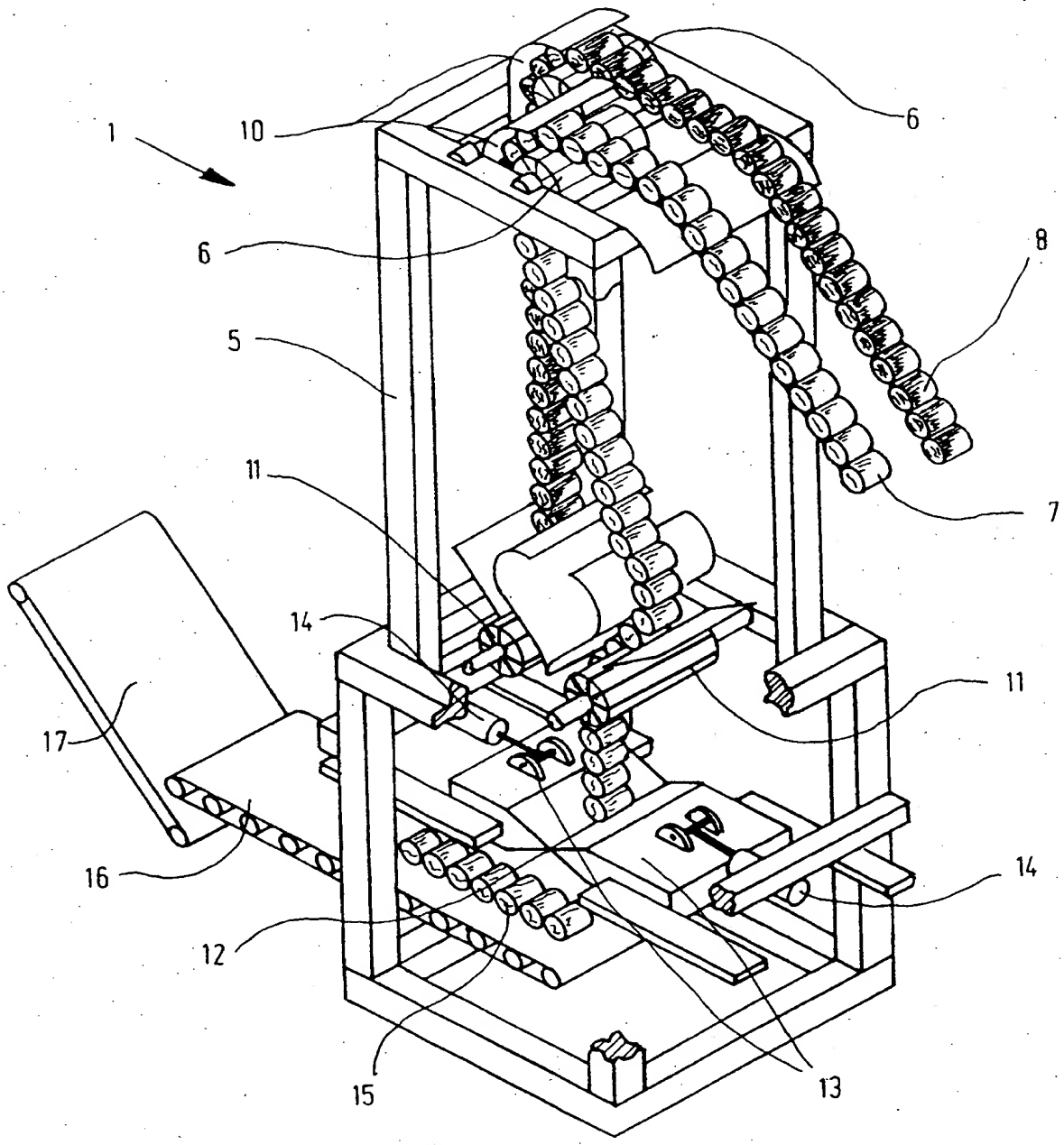

Fig 2.

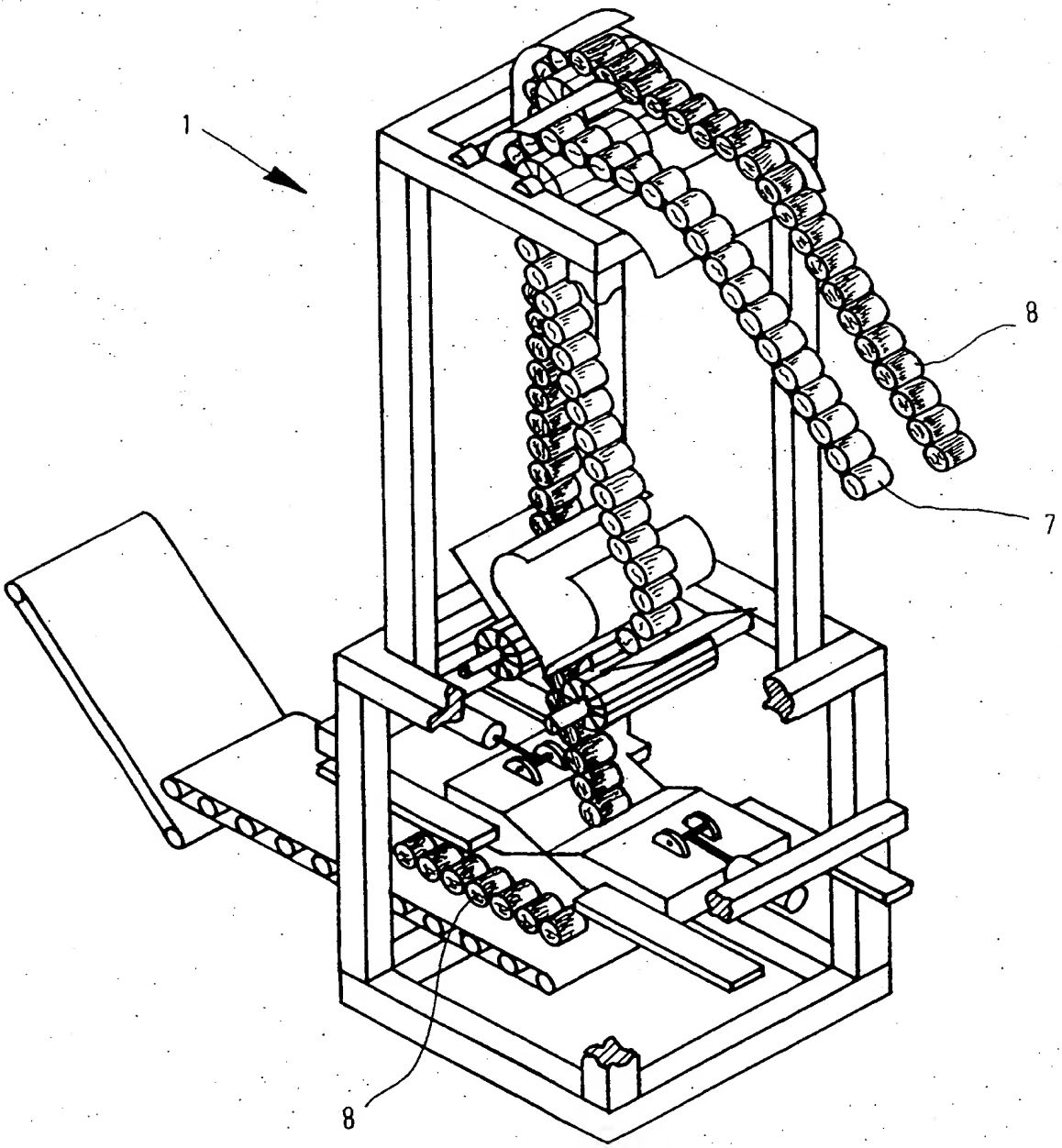

Fig 3.

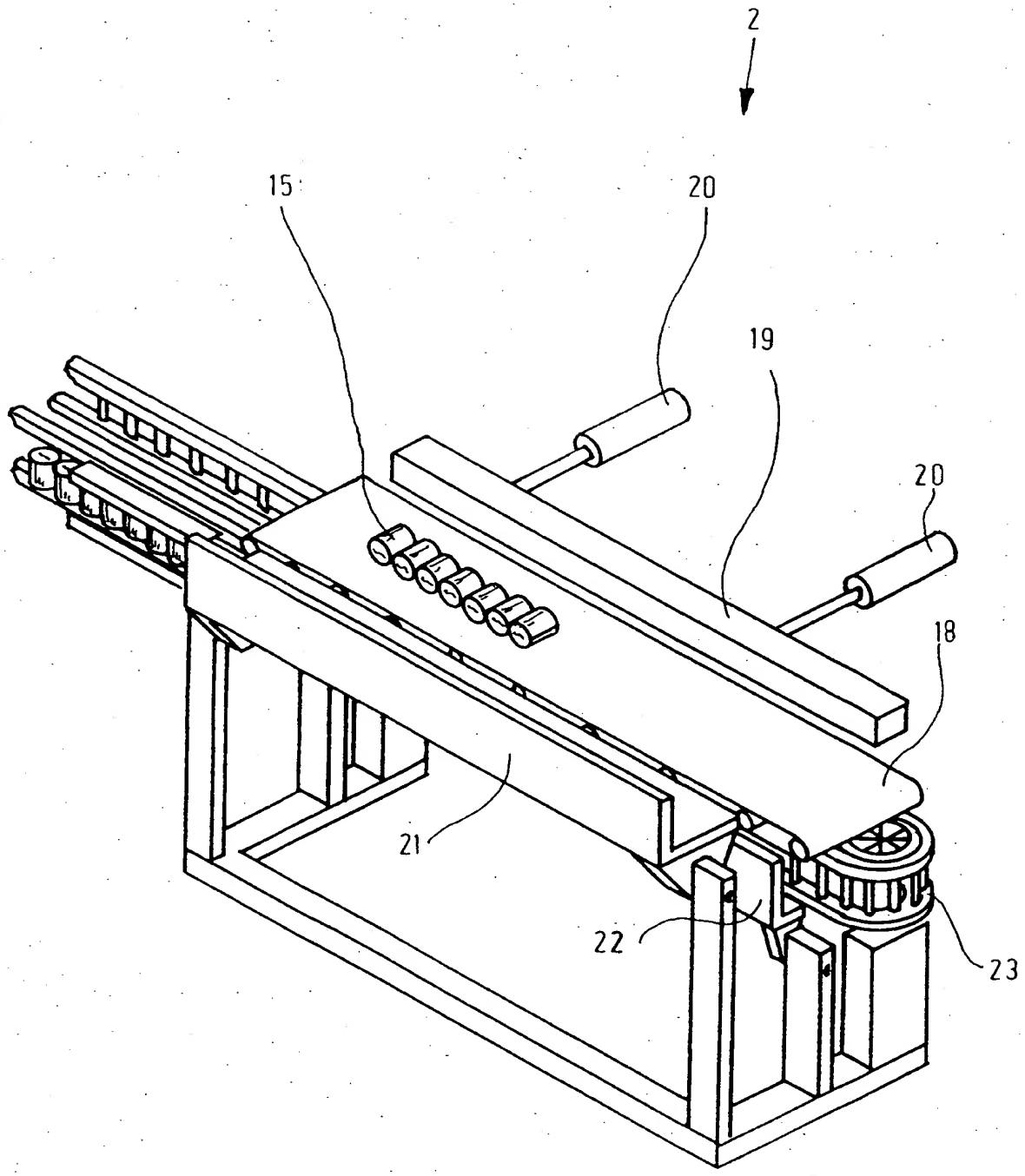

Fig 4.

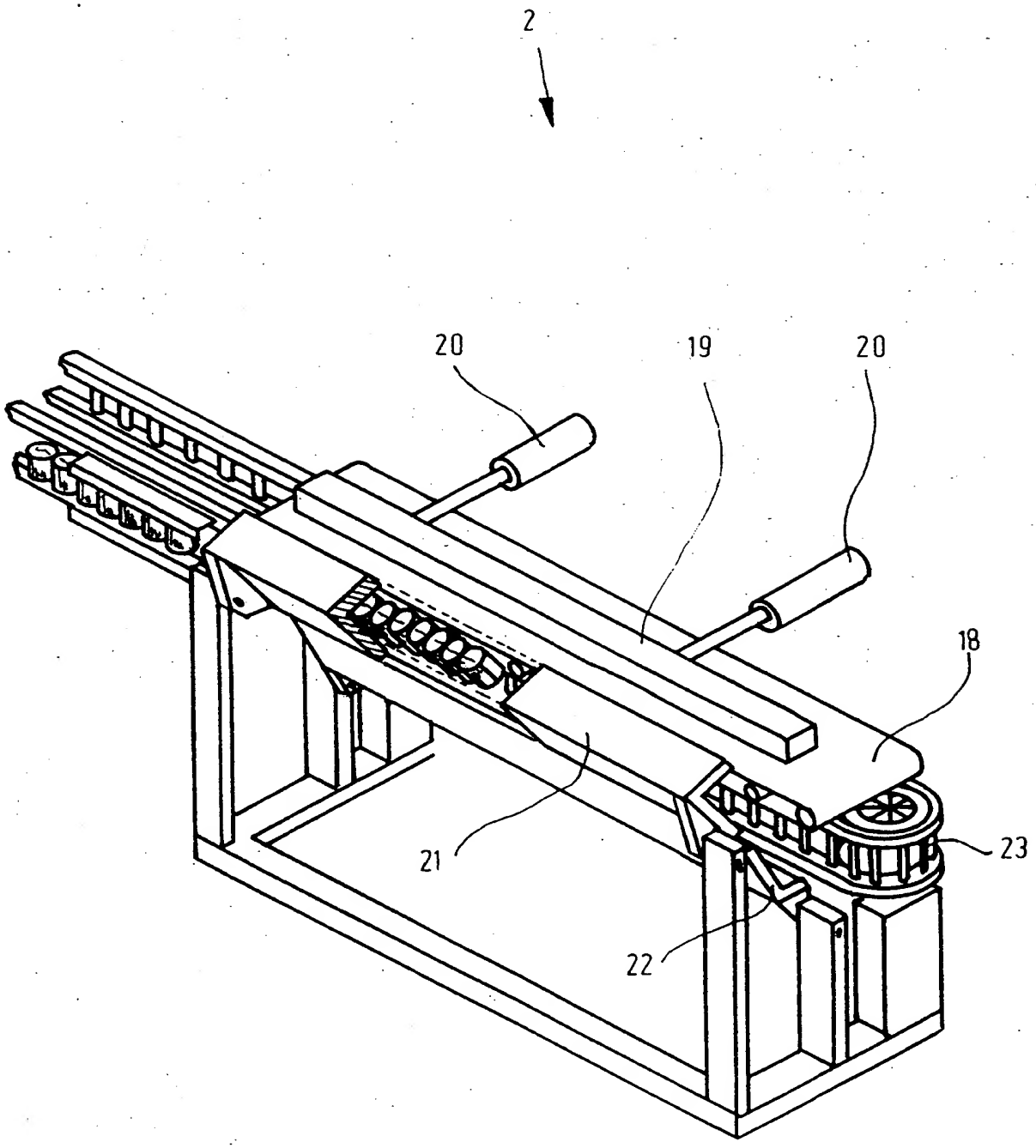

Fig 5.

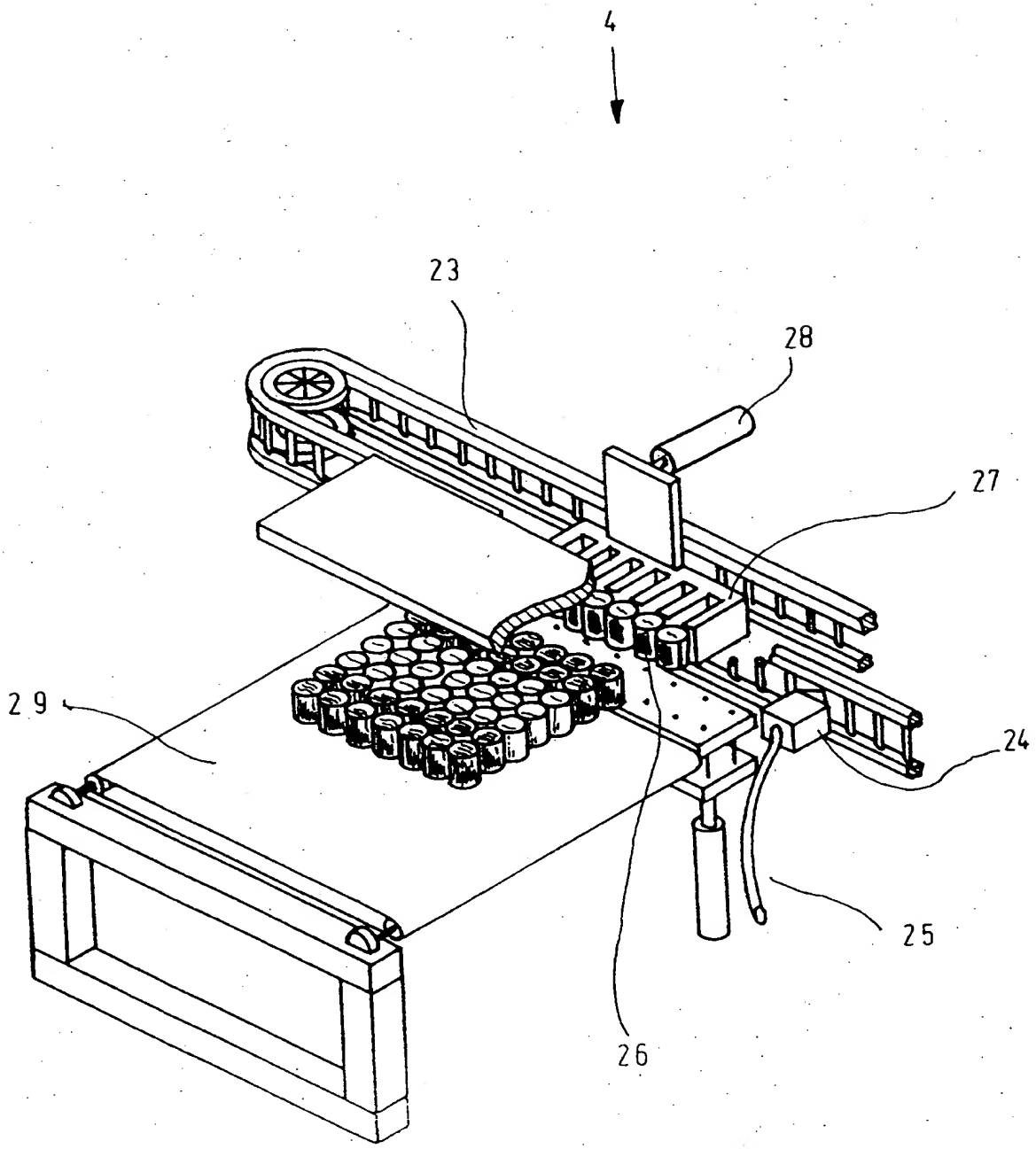

Fig 6.

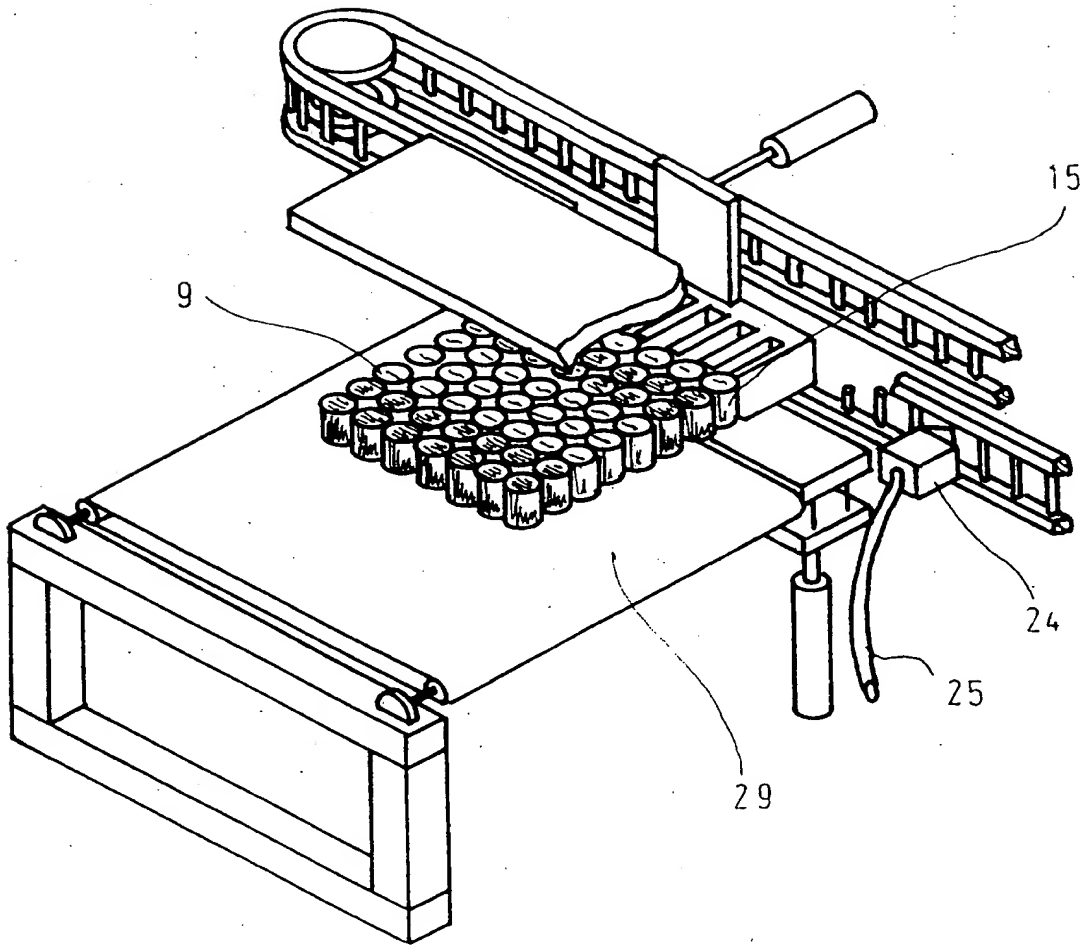

Fig 7.

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EUROPEAN SEARCH REPORT

Application Number
EP 93 61 0032

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	EP-A-0 089 789 (PERMAFLEX) * claim 2; figure 5 *	1	B68G9/00 A47C27/06
A	EP-A-0 421 495 (B'LINEA)		
D,A	EP-B-0 154 076 (SIMMONS)		
D,A	EP-A-0 155 158 (SIMMONS)		

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

B68G
A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	18 August 1994	Korth, C-F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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